

and was in the critical battles north of Ypres. Later he took charge of the medical department of the McGill Hospital, and a few days before his death had been appointed consulting physician to one of the British divisions. He was a keen soldier, with a fine spirit of devotion to duty, and a personality which made him beloved by a wide circle of friends on both sides of the Atlantic.

Among Canadian poets Dr. McCrae had a high place. War poems from his pen have appeared in the *Spectator* and in *Punch*. "Flanders' Fields" has the true ring and will live:

In Flanders' Fields the poppies blow
Between the crosses, row on row,
That mark our place, and in the sky
The larks still bravely singing fly,
Scarce heard amid the guns below.
We are the dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved; and now we lie
In Flanders' Fields.

Take up our quarrel with the foe,
To you from failing hands we throw
The Torch—be yours to hold it high;
If ye break faith with us who die,
We shall not sleep, though poppies grow
In Flanders' Fields.

NOTES.

THE political correspondent of the *Daily Mail* announces that the Government has sanctioned a scheme, which will involve several millions of pounds, to provide capital to develop the dye industries in this country. It has been realised for some time that the provision made in 1915, when British Dyes, Ltd., was established, is altogether inadequate to place the industry in a position comparable with that of the great German syndicate of dye manufacturers. The capital of these firms is more than 50,000,000*l.*, whereas that of British Dyes, Ltd., is only about 2,000,000*l.*, and the whole of our dye manufacturing firms have much less than one-tenth the capital of the German syndicate. It is obvious, therefore, that even if a co-operative scheme is arranged between these separate enterprises, much more will have to be done to increase the total capital available for the industry, build the necessary plant, and secure a sufficient number of research chemists and chemical engineers to enable our dye manufacturers to face the severe competition to which they will be subjected at the end of the war. The industry is of prime importance to our national development, for it is bound up with many other manufactures, directly or indirectly, and its ramifications enter into most arts of peace as well as those of war. We are glad to learn, therefore, that the Government is taking the necessary steps to make our position strong enough to withstand the severe assaults which it will have to bear when commercial competition is not restricted by conditions of war.

We learn from a message from the Petrograd correspondent of the *Times*, published in the issue of February 20, that the abolition of the Julian calendar and the substitution of the reformed, or Gregorian, calendar has been formally announced by the Government of the People's Councils. "Attempts from the time of Peter the Great to effect this reform have always failed through ecclesiastical opposition, but now that the Orthodox Church has been divorced from the State its opinions and traditions are entirely ignored."

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WE regret to see the announcement of the death, on February 16, at sixty-four years of age, of Dr. F. M. Sandwith, C.M.G., Gresham professor of physics, and lecturer at the London School of Tropical Medicine.

THE King has approved the grant of the Polar medal with clasp inscribed "Antarctic, 1914-16" to Sir E. H. Shackleton, Lieut. Frank Wild, Lieut. J. R. Stenhouse, and other members of the *Endurance* and *Aurora* parties of the Imperial Trans-Antarctic Expedition, 1914-16.

At the annual meeting of the Optical Society held on February 14, the election of officers and council for the year 1918-19 was announced as follows:—*President*, Prof. Cheshire; *Treasurer*, Mr. H. F. Purser; *Librarian*, Mr. J. H. Sutcliffe; *Secretaries*, Mr. Wm. Shackleton and Mr. T. Smith. *Members of Council*, Naval Instructor T. Y. Baker, Mr. P. F. Everitt, Mr. J. W. French, Mr. E. B. Knobel, and Mr. F. C. Watts.

WE learn from *Science* that the U.S. War Department has established a Chemical Service Section and two lieutenant-colonels have been commissioned—Dr. R. F. Bacon, director of the Mellon Institute, Pittsburgh, to have charge of the chemical work in France, and Prof. W. H. Walker, of the Massachusetts Institute of Technology, to have charge of the work in the United States.

THE acting-secretary of the Decimal Association sends us the following extract from the *New York Tribune* of January 22:—"Adoption of the metric system of measurements for artillery and machine-guns and maps for the American overseas forces was announced to-day by the War Department. The change was agreed upon at the suggestion of the French Government to avoid confusion in France."

THE President of the Board of Agriculture and Fisheries has appointed a Committee to advise in regard to all electrical questions connected with the carrying out of experiments in electro-culture, and, particularly, with regard to the construction of apparatus suitable for use on an economic scale and to the making of such electrical measurements as may be necessary in connection with the experiments. The members of the Committee are as follows:—Sir John Snell (chairman), Mr. A. B. Bruce, Prof. V. H. Blackman, Dr. C. Chree, Mr. W. R. Cooper, Dr. W. H. Eccles, Mr. J. S. Highfield, Prof. T. Mather, Dr. E. J. Russell, and Mr. C. T. R. Wilson. Mr. B. W. Phillips, of the Board of Agriculture and Fisheries, will act as secretary to the Committee, and all communications should be addressed to him at 4 Whitehall Place, S.W.1.

WE regret to note that the death of Mr. John Farquharson McIntosh is recorded in *Engineering* for February 15. Mr. McIntosh was born in 1848, and was connected with the Scottish railways for fifty-two years, nineteen of which he served as locomotive superintendent of the Caledonian line. Immediately after his appointment he began to design a series of locomotives, beginning with the "Dunalastair" for the Glasgow and Carlisle passenger service. He was invited by the Belgian Government to prepare designs suitable for the international express service on the State railways from Ostend. Mr. McIntosh was a member of the Association of Railway Locomotive Engineers, and was president in 1911, in which year also he was created a member of the Royal Victorian Order.

At the outbreak of the war the Swiss Federal Government seized all the instruments installed in Swiss wireless stations, so that such stations could no

longer receive the daily time-signals transmitted from the Eiffel Tower. At the urgent request of several establishments, the Swiss Administration of Telegraphs and Telephones decided to arrange for the retransmission of such signals, by telephone, as received from the Paris Observatory. Since August, 1916, therefore, Swiss telephone subscribers have thus been able to receive, by telephone each day, between 10.56 and 11 a.m., the Eiffel Tower signals transmitted to Berne and repeated simultaneously. In a recent communication to the Swiss Geophysical Society (quoted in *La Nature* for February 2), M. Paul Ditisheim, the eminent Swiss horologist, states that this service has worked perfectly, and that the signals transmitted in this manner do not vary more than ± 0.087 sec. from the time as transmitted from Paris.

REPLYING to a number of questions raised by the vote for a supplementary sum of 4000*l.* for expenditure in respect of art and science buildings in connection with the Civil Service Supplementary Estimates, Sir A. Mond said, in the House of Commons on Monday, February 18, that the Imperial Institute was partly occupied for the sugar rationing purposes of the Ministry. As to the new Science Museum, it was in course of construction, and incomplete. It had been represented that the work of construction ought to be continued during the war, but he was not in a position to complete the construction of museums in existing circumstances. Considerable expense had been incurred in making the finished part of the building suitable for the work now to be done there. Museums now wholly or partly occupied by Government Departments were the National Gallery, the Tate Gallery, the Wallace Gallery, the Victoria and Albert Museum, and the British Museum, of which a small part had been taken over. The vote was agreed to.

THE Norwich Public Library has received for its extensive local collection a valuable donation from Mr. A. H. Patterson, the well-known Norfolk naturalist. On Tuesday, February 19, the Norwich City Council passed a resolution of thanks to Mr. Patterson for his generous gift of "a large and valuable collection of his writings and sketches, comprising his manuscript notebooks from 1878 to 1916 (including original drawings, printed articles, and letters), a complete set of his published works relating to the natural history of Norfolk, and about a thousand of his political, football, and fishing cartoons of local interest." Mr. Patterson has had the opportunity of making continuous observations for about forty years in a district—the Norfolk estuary (Breydon)—which is particularly attractive to naturalists. It is one of best districts in the country for observation of fishes and birds, including a large number of bird immigrants, some of which are extremely rare visitants to our shores. Great success has attended his unceasing vigilance, and he has been able to make valuable additions to the list of Norfolk fauna, particularly fishes. His notebooks are a mine of valuable information, for in them since 1878 he has recorded day by day his careful observations of the fauna, and has preserved notes of curious and interesting specimens which have been brought to him, pen-and-ink sketches, and coloured drawings of interesting examples, and letters from other naturalists regarding his work.

At the opening ceremony of the Bose Research Institute at Calcutta, the founder, Sir J. C. Bose, delivered an address, published in the *Pioneer Mail* of December 8 last, in which he pointed out that thirty-two years ago, when he began the teaching of science, it was generally supposed that the Hindu mind, immersed in metaphysical speculation, was unable to undertake

scientific inquiries. There were then no well-equipped laboratories, no skilled mechanics. "Twenty-three years ago some of the most difficult problems connected with electric waves found their solution in my laboratory, and received high appreciation from Lord Kelvin, Lord Rayleigh, and others. The Royal Society honours me by publishing my discoveries and offering an appropriation from a special Parliamentary grant." He added:—"The work already carried out in my laboratory on the response of matter and plant-life has opened out very extended regions of inquiry in physics, physiology, medicine, and psychology; but high success is not to be obtained without corresponding experimental exactitude; hence the instruments and apparatus designed here which stand before you in our entrance hall." The institute is admirably equipped for the special research which its staff intends to undertake. An interesting feature is a small garden of sensitive plants. A large double tracing is being automatically made in two parallel curves, one recording atmospheric changes, while the other summarises the responses of a large tree to these changing conditions for every minute of the twenty-four hours.

SOME exceptionally large stone implements discovered in 1887-88 near the Johnstone River, on the Pacific coast of Queensland, are described in the February issue of *Man* by Mr H. Ling Roth. The materials from which they are made are an altered diabase, argillaceous and micaceous grit, and an arenaceous shale. One implement measures 16.5 cm. by 10.9 cm. by 2.9 cm. Dr. Walter E. Roth, who made some inquiries regarding them, states that at the present day such stone axe-heads are not used—in fact, no stone axes are used. They seem to have been procured from quarries, one about ninety miles from the scene of the discovery. Dr. Roth found, in the neighbourhood of Boulia, an axe-head measuring 9 in. in its greatest diameter—considerably larger than any in the collection now described. These appear to be the largest dressed stones hitherto found in Australia, but the Bankfield Museum possesses a similar implement from Lifu, Loyalty Islands, formed of impure jade. It is not so large as some of the big New Caledonian stones fastened at right angles to a handle by sinnet passed through two holes in the stone.

ACCORDING to an investigation on the "Diet, Nutrition, and Excretion of Asiatic Races in Singapore," undertaken by Prof. J. Argyll Campbell, and published in the *Journal of the Straits Branch of the Royal Asiatic Society* in 1917, the energy value of the diet of a Chinese, a Tamil, or a Malay medical student was only about 1600 Calories. That of a Brahmin was higher, but, the diet being vegetable, was to a large extent unutilised. To compare with this, we may take the diet of an Anglo-Indian, according to McCay, which was 2800 Calories, and that of a Filipino, which was 2630 Calories. It is suggested that the low-energy value of the Singapore diet may be due to the moist atmosphere, which retards loss of heat by evaporation, so that less food is required. Another contributory cause is the small amount of muscular exercise taken by the Singapore student. Although Europeans in the tropics are not inclined to take much exercise, they cannot keep healthy on a European diet unless they do so. The author found the Singapore students to do as much brain work as his previous European students did.

IN a letter written on Christmas Day, 1917, from Dongonab, *via* Port Sudan, Nubia, Mr. Cyril Crossland reports his having found a species of *Ophioglossum* growing in a patch of disintegrated coral just below the top of a cliff 136 ft. high on Rawaya penin-

sula on the Red Sea coast, near lat. 21° N. The species in question is doubtless *O. capense*, Schlecht., which has already been recorded by Prantl as having been collected by Schweinfurth in May, 1864, in an adjacent locality—the western side of Macaur Island, lat. 21° N., on coral detritus. This species, unlike the European *O. vulgatum*, Linn., prefers dry situations. It was collected by Schimper in Abyssinia in sandy desert. The late Prof. Pearson met with it among Acacia scrub in German South-West Africa, and in deep sand at Kiubis, in Great Namaqualand. In Natal it has been found growing only on very dry sandy knolls near Durban. Mr. Crossland remarks that two showers in November constitute all the rain that had fallen at Dongonab during 1917, and that wholly dry years are common. The desert flora of lat. 21° N. is much less abundant, and individual plants are more stunted, than is the case only a hundred miles further south. Generally the plants that occur are confined to water-courses and drainage lines, but the cliff on which he met with the *Ophioglossum* bears a few bushes near the top.

We have received the 1916–17 part of the Transactions and Proceedings of the Perthshire Society of Natural Science, the pages of which show a continuance of careful work. Mr. Henry Coates, the curator of the admirable regional museum, deals with some stone cists from the Carse of Gowrie; Mr. Graham Callander has an interesting paper on methods of archaeological research; Mr. J. A. Donald discusses to good purpose some of the difficult problems of afforestation; Mr. D. A. Haggart describes, in a racy manner, various faunistic and floristic rambles in Mid-Perth, especially among the hills. One of Mr. Haggart's notes is enthusiastic over the delicious meal which may be made of roast sparrow, and another directs attention to a change of colour exhibited by the beetle, *Carabus catenulatus*, when it is excited. Mr. Barclay, the president of the society, records some interesting botanical rarities, such as *Potamogeton gracilis* (reputed to be a hybrid of *P. alpinus* and *P. heterophyllus*), which differs from all, or almost all, other pond-weed hybrids in being fertile and producing good fruit. It has hitherto been found in Britain in only one station in the Shetland Islands. The Proceedings contain a number of notes of interest, e.g. on the activity of a hedgehog in catching bees flying and crawling about in front of a hive, and on the sub-fossil antler of an elk (*Alces machilis*) found near Methven in 1801. It measured 27 in. across from one extreme snag to another, and weighed $8\frac{1}{2}$ lb. A good photograph is given. The Perthshire Society was founded in 1867, and it deserves to be congratulated on its record of fifty years of activity. It wears well, and is a fine example of what a local Natural History Society should be.

In an article on "Forestry in the Dominion of New Zealand," just published in the *Quarterly Journal of Forestry* (vol. xii., pp. 1–28), Sir W. Schlich gives an account of the present condition of the forests in that country, and critically discusses their future management. A Royal Commission, which submitted a report to the Government in May, 1913, practically recommended that the valuable native forests should be replaced by artificial plantations of exotic trees. Sir W. Schlich considers it injudicious to neglect the natural forests, and urges that a considerable area of these should be declared permanent State reserves, and managed for the sustained production of timber in such a way that the more valuable species would naturally regenerate themselves. It is a melancholy fact that, apart from a few remnants, the Kauri forests have been destroyed. This wonderful tree yields one of the finest coniferous timbers in the world, and surely

something might be done to restore the tree beyond the reservation of a few acres for sentimental reasons. It is asserted by the Royal Commission that "the timber trees of New Zealand are of much slower growth than those grown in forestry operations the world over." This opinion is quite unfounded. Mr. D. E. Hutchins, who has lately been in New Zealand, states that Kauri is fit to cut at 100 years old, and is then 2 ft. in diameter, which is a greater rate of growth than that of most European trees. Sir W. Schlich, using the meagre statistics available, holds that the growth of *Podocarpus Totara*, the second most valuable native conifer, is equal to that of silver fir, which produces the largest yield of timber of any tree on the continent of Europe. The article, which is replete with statistical, economic, and geographical information, is illustrated with four maps of New Zealand, showing the distribution of the forests, rainfall, and physical features.

MESSRS. R. D. SALISBURY and G. N. KNAPP, in "The Quaternary Formations of Southern New Jersey" (Final Report of State Geologist, vol. viii., 1917), illustrate by an admirable series of drawings the stages in the history of the coastal plain, the material of which is largely derived from Glacial outwash, and was accumulated under terrestrial conditions. A former diversion of the Hudson River is suggested.

THE Geological Survey of Scotland has issued a memoir on "The Economic Geology of the Central Coalfield of Scotland, Area II." (1917), covering the country round Falkirk. A number of vertical sections are conveniently included in a pocket at the end. We notice how the miners' words, "fakes," "blaes," and "ribs," which have also invaded Irish geology from the north, are accepted as technical terms, for the benefit of those who will primarily use the memoir.

THE Canadian Department of Mines has issued a recent memoir descriptive of the magnesite deposits of Grenville District, Quebec. Magnesite is a refractory material, extensively used in connection with the manufacture of open-hearth steel, and the British demand has been in the past supplied mainly from Greece, particularly from the island of Eubœa, which furnishes the mineral in a high state of purity, containing about 46 per cent. of magnesia, a little more than 1 per cent. of lime, and less than 1 per cent. of silica. It is of great importance that we should be able to obtain all the materials required for our basal industries from within the British Empire, and hence authoritative information upon these Canadian deposits is very welcome. The Grenville area lies just to the north of the River Ottawa, about midway between the towns of Ottawa and Montreal, and is thus conveniently situated as regards exportation of its mineral production. A considerable number of separate deposits have already been proved to exist; the magnesite is practically everywhere intimately associated with dolomite, so that most of it contains more than 7 per cent. of lime. The quantity of magnesite already proved containing less than 12 per cent. of lime is estimated at close upon 700,000 tons, whilst nearly 500,000 tons of mixed magnesite and dolomite, containing more than 12 per cent. of lime, are also known to exist, and there is evidence that other deposits of magnesite still remain to be discovered. It is important that the attention of ironmasters in this country should be directed to the existence of a new source of supply of this important material.

IN the *Philosophical Magazine* for January Dr. J. G. Leatham discusses the motion of a hydrodynamical liquid past a two-dimensional contained solid having a

motion of translation and rotation. The object of the paper is to apply the method of periodic conformal transformation to problems of this class of a more general character than those commonly given in textbooks. For this purpose the motion is divided into two portions, viz. a uniform rotation of the solid and liquid and a spinning motion with equal and opposite spin past the solid boundary supposed at rest, the two motions combined making up the required hydrodynamical solution.

In the December issue of *The Central* Mr. R. A. S. Thwaites, of Messrs. Allen and Co., Bedford, gives a valuable summary of the results which have been obtained by a study of the effects of the heat treatment of nickel-chrome and other steels on their mechanical properties. This study has been forced on the British steel manufacturers by the authorities insisting that steels for aeroplane engines should satisfy an impact test which the foreign steels available before the war satisfied without difficulty. By hardening the steel at 830° C., and tempering at 640° C. instead of 250° C., the number of foot-pounds required to break a small notched bar by the Izod test can be raised from 25 to 92. The yield point and ultimate strength of the steel are reduced by this treatment, and Mr. Thwaites gives curves showing how all the principal mechanical properties of the steel are affected by tempering at temperatures between 350° and 600° C. From these curves the proper tempering temperature to ensure steel of given mechanical properties may be found.

DURING the last few years a number of experimenters, including Reinganum, Walmsley and Makower, Miehl, Mayer, Sahni, Kinoshita and Ikeuti, have published excellent photographs showing the tracks of individual α particles from radium which strike the photographic plate at glancing incidence. In a recent paper Kinoshita and Ikeuti (*Journ. Coll. Sci., Imper. Univ., Tokio*, November 20, 1917) sum up our information on this interesting subject, and show a number of such photographs. Special methods were used to obtain very small radiating nuclei, so that the radial tracks of the expelled α particles show up clearly. The track of an α particle (magnification 500 to 1500) is not continuous, but marked by a number of developed grains from ten to twenty in number, depending on the velocity of the particle. An estimate is given of the diameter of these grains, with a discussion of the general theory of their formation and of the action of α rays on a photographic plate.

A RECENT issue of *Industrial Management* (*The Engineering Magazine*) contains several informative articles by officials connected with departments of the United States Government. The Hon. William C. Redfield, Secretary of the Department of Commerce, gives several striking instances of the waste that goes on continually in industry. According to the Department of Agriculture, 65 per cent. of a tree is wasted in converting it into lumber, and ten million dollars further is wasted annually in drying the lumber so made. Again, vast amounts of scrap wood available for making pulp, alcohol, or vegetable products are burned or allowed to rot. It has only recently been realised that whale meat is a delicacy, and that the intestines of the whale make good leather. In the past the carcasses of seals were invariably thrown away after removing the skin, although the blubber can be used to make oil, the flesh for meat, and the bones for fertiliser. Germany, on the other hand, is pre-eminently an economical country, and many of her industries, such as those associated with dyestuffs and explosives, were built up on

so-called waste products. The four chief defects in industry to be overcome are:—(1) Separation of science from industry; (2) industrial waste; (3) lack of industrial and commercial education; and (4) ignorance of manufacturing costs. The Hon. L. F. Post gives a summary of the work of the Department of Labour in connection with the war. Among other feats, it has registered 10,000 ship workers in ten days, placed more than 300,000 men in manufacturing employment last year, and adjusted 323 labour controversies in war industries between January 1 and October 25, 1917. Finally, Mr. H. E. Coffin discusses the general organisation of the business department of the United States Government, and analyses the functions of the somewhat complex boards and committees. The complaint has been made that there is too much subdivision. Mr. Coffin, however, thinks that the confusion is more apparent than real—in short, that the three main groups of the war organisation, dealing respectively with purchasing, industrial policy, and labour, are “shaking down.”

Engineering for February 15 reproduces some interesting photographs of damage done to the machinery of German steamers interned in Brazil. These photographs illustrate the thoroughness of German destruction; in one case of two damaged cylinders, at least 8000 holes must have been drilled transversely and vertically through the cylinders. The cylinders illustrated had been broken into hundreds of small pieces, and in order to make new cylinders to suit the set of engines it was necessary to collect as many pieces as possible and to patch them together so that the dimensions could be measured accurately. Most of the broken parts were found carefully stored between decks, evidently in order to be used as scrap metal in Germany in the event of the return of the ships to the Fatherland. The number of German vessels interned in Brazil was approximately forty-five, totalling 235,000 gross tons. In the early part of 1917 the Brazilian Government invited Messrs. Vickers, Ltd., to survey the damage and carry out the steps necessary for repair. It was found that the repairs could be carried out in the naval arsenal of Brazil, and great credit is due to the engineering officers of the Brazilian Navy, not only for executing the work, but also for the expedition with which it was carried out.

MESSRS. A. GALENKAMP AND CO., LTD., of Sun Street, Finsbury Square, E.C.2, have sent us their circulars describing viscometers and centrifugal machines. In the former list are placed Redwood's and Engler's instruments, with details for use. No technical-school laboratory or any works wherein lubricating oils are largely used should be regarded as completely equipped without one of these standard viscometers, for, although it is possible to determine the viscosity of an oil in the usual physico-chemical way, yet the conversion of “absolute viscosity” to “seconds Redwood” is by no means possible with accuracy in every case, and one must remember that the grading of an oil is largely determined by its Redwood number, and not by its true viscosity. In the same list is described a convenient stop-watch for timing the flow of oil. Pensky-Martin's, Gray's, and the Abel flash-point apparatus are also included in this list. For some time past there has been a demand for convenient and compact laboratory centrifuges. In the circular to hand (No. 193) are described hand patterns from so low a price as two guineas to small power-driven instruments, built to run at 5000 revolutions per minute. A modification, designed for the rapid drying of crystals, and based on the design of the works “whizzer,” will doubtless be found of value in many laboratories.